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ABSTRACT

The aims of this study were (1) to assess the relative effectiveness of verbal and visual elaboration prompts and question-answering prompts on children's incidental memory, and (2) to determine whether performance improvement associated with pictorial elaboration could be augmented by either verbal elaboration or question-answering procedures. Forty-eight 5- and 6-year-old children were randomly assigned in equal numbers to one of six experimental conditions in two one-way experimental designs. Subjects were presented with a 20-item list of noun pairs under incidental memory conditions. Pairs were presented at a rate of 12 seconds per pair on the inspection trial; after an interval of 30 seconds, subjects were given a surprise cued recall test. Conditions in the first experiment were control, pictorial elaboration, verbal elaboration, and question-answering. Conditions in the second experiment were pictorial elaboration, pictorial elaboration plus verbal elaboration, and pictorial elaboration plus question-answering. Results indicated that both the question-answering and the two elaboration conditions facilitated incidental memory; question-answering and verbal elaboration conditions were superior to the pictorial elaboration condition. Further, results indicated that incidental memory performance associated with a pictorial condition can be enhanced by requiring the subject to verbally elaborate the pair relationship or respond to a "Why?" question. (RH)

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Effects of Question Answering versus Elaboration on Children's Incidental Memory

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Young children are production deficient in the use of elaborative coding in associative memory tasks. An effective prompt has been verbal elaboration. This technique requires the child to embed the to-be-remembered nouns into a sentence context (e.g., The fish smokes the pipe.). Prompting verbal elaboration in young children improves associative memory performance in contrast to standard control conditions (see Rohwer, 1973).

Recent evidence suggests that under incidental memory conditions "question answering" prompts may be more effective than verbal elaboration (see Pressley & Bryant, 1982; Turnure, Buium, & Thurlow, 1976). Question answering prompts require the child to answer a "What" or "Why" question about a pair relationship (e.g., Why is the fish smoking the pipe?). This question answering prompt has been compared to verbal elaboration conditions in which the subjects are asked to repeat a sentence which includes the to-be-remembered nouns.

In addition to verbal elaboration, pictorial elaborative prompts are also effective in facilitating children's associative memory. This procedure consists of presenting the child with a picture which depicts an interactive relationship for the noun referents (e.g., a picture of a fish smoking a pipe) (see Kee & White, 1977). One objective of the present study was to assess the relative effectiveness of the different types of elaborative and question answering prompts in facilitating children's incidental memory. A second objective was to determine if the performance improvement associated with pictorial elaboration could be augmented by either verbal elaboration or question answering procedures (see Kee & Nakayama, 1980).

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Methods and Procedures

In order to answer the questions of interest, six experimental conditions were partitioned into two one-way experimental designs. The first design provides a comparison between the different prompt conditions. The conditions were: Control--Children were shown pictures of noun referents presented side-by-side and asked to repeat an experimenter-provided label for each noun; Pictorial Elaboration--Children were shown pictures of the noun referent pairs engaged in an interaction and they were asked to repeat an experimenter-provided label for each noun; Verbal Elaboration--Children were shown pictures of the noun referents presented side-by-side and asked to repeat an experimenter-provided sentence for the pair (e.g., "The fish smokes the pipe."); and Question Answering--Children were shown pictures of the noun referents depicted side-by-side and asked a "Why?" question about the pair (e.g., "Why is the fish smoking the pipe?"). The second design provides evidence concerning whether the

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level of memory performance associated with pictorial elaboration is augmented by either verbal elaboration or question answering. The conditions of the second design were: Pictorial Elaboration--Children were shown pictures of the noun referent pairs engaged in an interaction and they were asked to repeat an experimenter-provided label for each noun; Pictorial Elaboration plus Verbal Elaboration--Children were shown pictures of the noun referent pairs engaged in an interaction and they were asked to verbally describe the pair relationship; and Pictorial Elaboration plus Question Answering--Children were shown pictures of the noun referent pairs engaged in an interaction and they were asked to answer a "Why?" question about the pair relationship (e.g., "Tell me why this happened."). Experimenter-provided noun labels were provided in all conditions.

Forty-eight five and six year old children were randomly assigned in equal numbers to one of the six experimental conditions. The children were presented with a twenty-pair list of noun pairs under incidental memory conditions (see Kee & Nakayama, 1980). Pairs were presented at a 12 sec per pair rate on the inspection trial. After an interval of 30 sec subjects were given a surprise cued recall test.

Results and Discussion

The dependent variable of number of correct cued recall responses was evaluated. Dunn's multiple comparison procedure was used to evaluate the expected patterns of results. The Type I error rate was set at .05 and a difference ($\bar{d}$) of 2.62 was required for statistical significance ($\overline{mse}$ [44] = 12.92). The means for the conditions in Designs 1 and 2 are presented in Table 1.

For Design 1 the results indicated that the question answering and elaboration conditions facilitated incidental memory performance relative to the control condition. The question answering condition did not differ from the verbal elaboration condition. However, both were associated with a higher level of associative incidental recall in comparison to the pictorial elaboration condition.

For Design 2 the results indicated that the incidental memory performance associated with a pictorial elaboration condition can be enhanced by requiring the subject to verbally elaborate the pair relationship or respond to a "Why?" question. Performance in the verbal elaboration and question answering conditions in this latter design did not differ reliably.

The results of the first design provide evidence concerning the relative effectiveness of question answering versus elaboration prompts in children's incidental associative memory. Consistent with previous studies, both question answering and the elaboration prompts facilitated noun-pair retention relative to a standard presentation condition. Although question answering procedures have been found to be more effective than verbal elaboration in some previous work (e.g., Turnure, Buium, & Thurlow, 1976), these two conditions did not differ reliably in the present study. This result is consistent with a more recent finding reported by Pressley and Bryant (1982) which suggests

that the superiority of question answering to verbal elaboration may be limited to some specific task and subject conditions.

A new finding is the superiority of both verbal elaboration and question answering in comparison to pictorial elaboration. Previous studies have not found consistent differences between verbal vs. pictorial elaboration in studies of intentional learning (e.g., Kee & Beuhring, 1978) and the present study provided one of the first comparisons between question answering vs. pictorial elaboration (also see Kee & Nakayama, 1980). The relative inferiority of pictorial elaboration to the other prompt conditions may be due in part to corresponding differences in the amount of "active" processing required. In the pictorial elaboration condition children were asked to inspect pictures of noun referents interacting and repeat their names. In contrast, the verbal elaboration condition required the child to repeat aloud the verbal description for the pair, while the question answering condition asked the child a "Why?" question about the pair relationship. A higher level of pictorial elaboration performance would be expected if subjects had been required to imagine the referents engaged in an interaction during the inspection interval. Results from the second design support the hypothesis that additional active processing can enhance the performance level associated with pictorial elaboration. Recall that where pairs were presented under pictorial elaboration, both verbal elaboration and question answering procedures augmented recall relative to pictorial elaboration alone.

Table 1

Design 1: Mean Number of Correct Responses for Four Incidental Memory Conditions

Control	Pictorial Elaboration	Verbal Elaboration	Question Answering
2.00	9.17	12.00	12.50

Design 2: Mean Number of Correct Responses for Three Incidental Memory Conditions

Pictorial Elaboration	Verbal Elaboration	Question Answering
9.17	12.83	14.50

Note: mse (44) = 12.92

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